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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/702,459 | 11/07/2003 | Mitsuhiro Okuda | 61352-058 | 9724 |

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| EXAMINER | |
|---|---|
| VANIK, DAVID L | |
| **ART UNIT** | **PAPER NUMBER** |
| 1615 | |

DATE MAILED: 09/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/702,459 | OKUDA ET AL. | |
| | Examiner | Art Unit | |
| | David L. Vanik | 1615 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1,2,4-11 and 13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-11 and 13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 8/11/2005
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

Receipt is acknowledged of the applicant's Amended Claims and Remarks filed on 6/2/2005.

The 35 USC § 102 rejections of claims 1-5 and 7-15 over Okuda et al and claims 1-3, 5-11, 14-15 over US 5,304,382 ('382) are hereby **withdrawn**. Because the instant claims 14-15 have been cancelled, the 35 USC § 102 rejections over 5,690,903, WO98/22942, and 5,358,722 are hereby **withdrawn.**

### *New Rejections*

The following are new rejections.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-2, 5-11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,304,382 ('382) in view of US 4,102,863 ('863).

'382 teach nanoparticles comprising an apoferritin protein shell packed with polyvalent metals, such as ammonium, chromium, and copper (column 4, line 54 – column 5, line 15). Other chemical entities, such as carbonate and mixtures of hydroxides and oxides can also be present in the apoferritin protein shell (column 5, lines 7-15). Said nanoparticles can be prepared by combining the apoferritin protein shell together with metal ions or other chemical entities such as carbonate and mixtures of hydroxides and oxides in a solution (column 6, lines 51-67). The solution can be buffered with compounds such as HEPES or ammonium acetate (column 6, lines 51-55). According to '382, choice of the pH solution is influenced by the solubility of the material to be incorporated into apoferritin (column 6, lines 64-67). If desired, the protein an be eliminated with the addition of heat to the nanoparticle (Example 4). It is the examiner's position that one of ordinary skill in the art at the time the invention was

made would have the capacity to adjust the pH of the solution based on the specific application.

'382 does not teach forming carbonate ions by bubbling carbon dioxide.

'863 teach methods of forming resins (abstract and claim 1). According to '863, carbonate formation can occur by bubbling carbon dioxide in a water-based solution (column 4, lines 10-20). As such, bubbling carbon dioxide in a solution of water is an effective way to form carbonate ions. Because bubbling carbon dioxide in a solution of water can form carbonate ions, one of ordinary skill in the art would have been motivated to bubble carbon dioxide in a solution of water to form the carbonate ions used in the particles advanced by '382. Based on the teachings of '863, there is a reasonable expectation that bubbling carbon dioxide in a solution of water can form carbonate ions. As such, it would have been obvious to one of ordinary skill in the art at the time the invention was made to bubble carbon dioxide in a solution of water to form the carbonate ions used in '382 in view of the teachings of '863.

It should be noted that numerous other references including the following provide motivation to form carbonate ions by bubbling carbon dioxide: US 4,458,584 (Claim 1), US2002/0009410 (paragraph 0085), and US 5,992,700 (column 2, lines 37-47).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,304,382 ('382) in view of US 4,102,863 ('863) and further in view of English translated JP 2001-504277 ('277).

The teachings of '382 and '863 are set forth above. '382 does not teach a method of inserting a nickel ion into the cavity of a protein.

'277 teach a magnetizable device comprising nano-scale ferromagnetic particles (page 1). According to '277, the nanoparticles can be formed by incorporating a metal alloy, such as nickel, into a protein, such as apoferritin (page 3). According to '277, it is advantageous to incorporate nickel into a protein because of its ferromagnetic properties (page 3). Because, according to '277, nickel has ferromagnetic properties, one of ordinary skill in the art would have been motivated to incorporate it into a protein, such as apoferritin, in order to form a nano-scale ferromagnetic particle useful in a magnetizable device. Based on the teachings of '277, there is a reasonable expectation that nickel, when incorporated into a protein containing a cavity such as apoferritin, would form a nano-scale ferromagnetic particle useful in a magnetizable device. As such, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate nickel, an element with ferromagnetic properties, into a protein with a cavity, such as apoferritin, in the invention advanced by '382 in view of the teachings of '277.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

## Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Vanik whose telephone number is (571) 272-3104. The examiner can normally be reached on Monday-Friday 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carlos Azpuru, can be reached at (571) 272-0588. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Vanik, Ph.D.
Art Unit 1615

9/17/05

CARLOS A. AZPURU
PRIMARY EXAMINER
GROUP 1500